



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/932,567	08/17/2001	Chidambar Ganesh	79740	5003

7590 09/10/2004

Office Of Counsel, Bldg 112T
Naval Undersea Warfare Center
Division, Newport
1176 Howell Street
Newport, RI 02841-1708

EXAMINER

BELL, MELTIN

ART UNIT	PAPER NUMBER
----------	--------------

2121

DATE MAILED: 09/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/932,567

Applicant(s)

GANESH, CHIDAMBAR

Examiner

Meltin Bell

Art Unit

2121

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

In response to applicant's telephone inquiries on 2/20/04, 3/22/04 and 3/31/04 regarding the last Office action, the following corrective action is taken.

The period for reply of 3 MONTHS set in said Office action is restarted to begin with the mailing date of this letter.

The reference *Kunemund et al* USPN 5,704,010 was not correctly cited in the last Office action. The correct citation is shown on the attached PTO-892.

Copies of the following references not previously supplied are enclosed:

- *Ganesh*; USPN 6,282,526; Fuzzy logic based system and method for information processing with uncertain input data
- *Giacalone et al*; U.S. Patent Number 5,710,867; Method for parallel processing of fuzzy logic inference rules and corresponding circuit architecture with fuzzy inputs and outputs
- *Bessacini et al*; USPN 5,671,138; Fuzzy controller for acoustic vehicle target intercept guidance
- *Kunemund et al*; USPN 5,704,010; Arrangement for rule decoding and evaluation for a high-resolution fuzzy inference processor
- *Singh et al*; "Fuzzy Logic Applications to Multisensor-Multitarget Correlation"; IEEE Transactions on Aerospace and Electronic Systems; Vol. 33, Iss. 3; July 1997; pp 752-769

Art Unit: 2121

- *Hicks et al*; "Intelligent Agent-Based Software Architecture for Combat Performance under Overwhelming Information Inflow and Uncertainty"; Proceedings Seventh IEEE International Conference on Engineering of Complex Computer Systems; 11-13 June 2001; pp 200-210
- *Hisano*; USPN 5,179,625; Fuzzy Inference System Having a Dominant Rule Detection Unit
- *Tsutsumi et al*; USPN 5,131,071; Fuzzy Inference Apparatus
- *Hisano*; EPN 0 361 401 A2; Fuzzy Inference System Having a Rule Processing Means
- *Fagarasan et al*; USPN 5,317,319; Automatic Global Radar/IR/ESM Track Association Based on Ranked Candidate Pairings and Measures of their Proximity
- *Komai et al*; USPN 5,218,555; Method for Judging a Color Difference Using Rules Fuzzy Inference and Apparatus Therefore
- *Tsuda et al*; USPN 5,175,795; Hybridized Frame Inference and Fuzzy Reasoning System and Method
- *Sekine*; USPN 5,186,150; Method and System for Measuring Fluid Flow Rate by Using Fuzzy Inference
- *Togai et al*; "Expert System on a Chip"; Proceedings of the ACM SIGART international symposium on Methodologies for intelligent systems; December 1986
- *Dougherty et al*; "An approximate Optimal Ballistic Intercept Guidance Law"; Proceedings of the 33rd IEEE Conference on Decision and Control; Vol. 4; 14-16 Dec. 1994; pp 3871-3876

A corrected copy of the last Office Action and Notice of References Cited, Form PTO-892, are enclosed. Claims 1-18 in **09/932,567** filed **08/17/2001** have been examined.

Priority

Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

This application is claiming the benefit of a prior filed nonprovisional application under 35 U.S.C. 120, 121, or 365(c). Copendency between the current application and the prior application (#09/246,208 filed 1/20/99 USPN 6,282,526 issued 8/28/01) is required.

Information Disclosure Statement

Applicant is respectfully reminded of the ongoing Duty to disclose 37 C.F.R. 1.56 all pertinent information and material pertaining to the patentability of applicant's claimed invention, by submitting in a timely manner PTO-1449, Information Disclosure Statement (IDS) with the filing of applicant's application or thereafter.

The following documents identified in the specification would be appropriately disclosed in an IDS:

- U.S. Patent Numbers
 - 5,926,802 - page 9, line 5
 - 5,809,486 - page 9, line 13
 - 5,710,867 - page 10, line 3

- 5,677,996 - page 10, line 17
- 5,579,439 - page 11, line 11
- 5,524,179 - page 12, line 10
- Naval Undersea Warfare Center Division Newport, Newport RI, NUWC-NPT
Technical Report 10,876 1/20/98 "Fuzzy Logic-Based Inferencing in the Presence of
Input Data Uncertainty" by Chidambar Ganesh on page 13, lines 14-18.

Drawings

The drawings are objected to because:

- The terminating point indicating line 51 in Fig. 3 should be located farther away from line 51's intersection with line 61.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1, 7 and 13 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The language of the claims (e.g. "information", "physical phenomena", "possible values", "rules") raise a question as to

Art Unit: 2121

whether the claims are directed merely to an abstract idea that is not tied to a technological art, environment or machine which would result in a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101. For example, if claim 13 was amended to recite a computer-implemented method, it will be statutory in most cases since use of technology permits the function of the descriptive material to be realized.

Claim Rejections - 35 USC § 102

To expedite a complete examination of the instant application, the claims rejected under 35 U.S.C. 101 (nonstatutory) above are further rejected as set forth below in anticipation of applicant amending these claims to place them within the four statutory categories of invention.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 6-9, 12-13, 15-16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by *Giacalone et al* U.S. Patent Number 5,710,867 (January 20, 1998).

Art Unit: 2121

Regarding claim 1:

Giacalone et al teaches,

- a rule decomposer comprising a plurality of rules, each of said rules being utilized for producing an output in response to said plurality of inputs to thereby produce a plurality of rule decomposer outputs (Abstract, "A method and system... overall truth values"; Fig. 3)

- a union operator for determining a conjunction of said plurality of rule decomposer outputs to produce a fuzzy inference output (column 6, lines 17-20, "The computation unit ... type or defuzzified"; column 6, lines 51-56, "the processing block ... the calculator block 4"; column 7, lines 17-47, "The maximizer block ... the union block 19)

Regarding claim 2:

Giacalone et al further teaches,

- said each of said plurality of rules has an IF-THEN format (column 4, lines 41-43, "The inference rules...one consequent")

Regarding claim 3:

Giacalone et al further teaches,

- said fuzzy inference output of said fuzzy inference system being applied as an input to a control system (column 3, lines 22-36, "A third known...feedback output variables")

Regarding claim 6:

Giacalone et al further teaches,

- said union operator is described mathematically by an equation of the form:

$$M_{\mu a}(y) = \bigcup_{i=1}^M \mu_i(y)$$

(column 5, lines 52-63, "In the graphs...the universe U")

Regarding claim 7:

Giacalone et al further teaches,

- providing a plurality of fuzzy inference rules (Abstract, "A method and ... received overall truth values"; column 7, lines 7-45, "The input 25...inference rule R")
- producing a plurality of rule outputs in response to said uncertain input data (Fig. 3; column 6, lines 17-20, "The computation unit ... type or defuzzified"; column 6, lines 51-56, "the processing block ... the calculator block 4")
- inferring a fuzzy inference by determining a conjunction of said plurality of rule outputs (column 4, lines 54-62, "Another aspect of...logic inference rule"; column 6, lines 57-67, "The union block 19 ... the present invention"; column 7, lines 1-7, "can still be ... and one output 26")

Regarding claim 8:

The rejection of claim 8 is the same as that for claim 7 as recited above since the stated limitations of the claim are set forth in the reference.

Regarding claim 9:

Giacalone et al further teaches,

- precalculating said plurality of rule outputs (column 5, lines 64-67, "The operation for...are the following."; column 6, lines 1-20, "(1) the weight ... type or defuzzified";
- The examiner notes *Giacalone et al*'s estimating antecedent term weights of a fuzzy logic inference rule and updating the overall degree of rule truth as precalculating.)

Art Unit: 2121

Regarding claim 12:*Giacalone et al* further teaches,

- said conjunction is determined mathematically by utilizing an equation of the form:

$$M_{\mu a}(y) = \bigcup_{i=1}^M \mu_i(y)$$

(column 5, lines 52-63, "In the graphs... the universe U")

Regarding claim 13:*Giacalone et al* further teaches,

- producing a plurality of one dimensional solutions (Abstract, "A method and ... overall truth values") in response to said uncertain input data (Fig. 3, items 44, 58; column 5, lines 16-21, "With reference to ... same reference system")
- inferring a fuzzy inference output by determining a conjunction of said one--dimensional solutions (column 4, lines 54-62, "Another aspect of ... logic inference rule"; column 6, lines 17-20, "The computation unit ... type or defuzzified"; column 6, lines 51-56, "the processing block ... the calculator block 4")

Regarding claim 15:*Giacalone et al* further teaches,

- producing said plurality of one-dimensional solutions from a plurality of rules (column 4, lines 54-62, "Another aspect of ... logic inference rule"; column 6, lines 17-20, "The computation unit ... type or defuzzified"; column 6, lines 51-56, "the processing block ... the calculator block 4")

Art Unit: 2121

Regarding claim 16:

The rejection of claim 16 is the same as that for claim 15 as recited above since the stated limitations of the claim are set forth in the reference.

Regarding claim 18:

Giacalone et al further teaches,

- said step of determining a conjunction of said one dimensional solutions is described by a mathematical equation of the form:

$$M_{\mu a}(y) = \bigcup_{i=1}^M \mu_i(y)$$

(column 5, lines 52-63, "In the graphs...the universe U")

Claim Rejections - 35 USC § 103

To expedite a complete examination of the instant application, the claims rejected under 35 U.S.C. 101 (nonstatutory) above are further rejected as set forth below in anticipation of applicant amending these claims to place them within the four statutory categories of invention.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Giocalone et al* in view of *Bessacini et al* U.S. Patent Number 5,671,138 (September 23, 1997).

Regarding claim 4:

Giocalone et al's teaches:

- a rule decomposer comprising a plurality of rules, each of said rules being utilized for producing an output in response to said plurality of inputs to thereby produce a plurality of rule decomposer outputs (Abstract, "A method and system...overall truth values"; Fig. 3)

- a union operator for determining a conjunction of said plurality of rule decomposer outputs to produce a fuzzy inference output (column 6, lines 17-20, "The computation unit ... type or defuzzified"; column 6, lines 51-56, "the processing block ... the calculator block 4"; column 7, lines 17-47, "The maximizer block ... the union block 19)

- said fuzzy inference output of said fuzzy inference system being applied as an input to a control system (column 3, lines 22-36, "A third known...feedback output variables")

However, *Giocalone et al* doesn't explicitly teach intercept guidance control systems while *Bessacini et al* teaches,

- said fuzzy inference (column 3, lines 25-32, "Based on a ... predetermined control regulation") output being applied to said intercept guidance control system to improve performance in presence of the physical phenomena (Abstract, "A target intercept...the second site")

Motivation – The portions of the claimed system would have been a highly desirable feature in this art for

Art Unit: 2121

- Improving target intercept guidance (*Bessacini et al*, column 4, lines 42-50, "it is an...undergo independent motion")

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify *Giacalone et al* as taught by *Bessacini et al* for the purpose of improving target intercept guidance.

Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Giacalone et al* in view of *Kunemund et al* U.S. Patent Number 5,704,010 (December 30, 1997).

Regarding claim 5:

Giacalone et al's teaches:

- a rule decomposer comprising a plurality of rules, each of said rules being utilized for producing an output in response to said plurality of inputs to thereby produce a plurality of rule decomposer outputs (Abstract, "A method and system...overall truth values"; Fig. 3)

- a union operator for determining a conjunction of said plurality of rule decomposer outputs to produce a fuzzy inference output (column 6, lines 17-20, "The computation unit ... type or defuzzified"; column 6, lines 51-56, "the processing block ... the calculator block 4"; column 7, lines 17-47, "The maximizer block ... the union block 19)

However, *Giacalone et al* doesn't explicitly teach RAM storage while *Kunemund et al* teaches,

Art Unit: 2121

- a dynamic RAM storage utilized for storing precomputed rule decomposer outputs
(column 7, lines 5-37, "The output from...the read/write memory")

Motivation – The portions of the claimed system would have been a highly desirable feature in this art for

- Optimizing processing speed and chip area (*Kunemund et al*, column 1, lines 28-36, "It is an... the present invention")

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify *Giacalone et al* as taught by *Kunemund et al* for the purpose of optimizing processing speed and chip area.

Regarding claim 10:

Giacalone et al's teaches:

- providing a plurality of fuzzy inference rules (Abstract, "A method and ... received overall truth values"; column 7, lines 7-45, "The input 25...inference rule R")
- producing a plurality of rule outputs in response to said uncertain input data (Fig. 3; column 6, lines 17-20, "The computation unit ... type or defuzzified"; column 6, lines 51-56, "the processing block ... the calculator block 4")
- inferring a fuzzy inference by determining a conjunction of said plurality of rule outputs (column 4, lines 54-62, "Another aspect of...logic inference rule"; column 6, lines 57-67, "The union block 19 ... the present invention"; column 7, lines 1-7, "can still be ... and one output 26")
- precalculating said plurality of rule outputs (column 5, lines 64-67, "The operation for...are the following:"; column 6, lines 1-20, "(1) the weight ... type or defuzzified";

The examiner notes Giacalone et al's estimating antecedent term weights of a fuzzy logic inference rule and updating the overall degree of rule truth as precalculating.) However, *Giacalone et al* doesn't explicitly teach Ram memory while *Kunemund et al* teaches,

- storing a result of said step of precalculating in RAM memory (column 7, lines 5-37, "The output from...the read/write memory")

Motivation – The portions of the claimed method would have been a highly desirable feature in this art for

- Optimizing processing speed and chip area (*Kunemund et al*, column 1, lines 28-36, "It is an...the present invention")

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify *Giacalone et al* as taught by *Kunemund et al* for the purpose of optimizing processing speed and chip area.

Claims 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Giacalone et al* in view of *Singh et al* "Fuzzy Logic Applications to Multisensor-Multitarget Correlation" (July 1997).

Regarding claim 11:

Giacalone et al's teaches:

- providing a plurality of fuzzy inference rules (Abstract, "A method and ... received overall truth values"; column 7, lines 7-45, "The input 25...inference rule R")

Art Unit: 2121

- producing a plurality of rule outputs in response to said uncertain input data (Fig. 3; column 6, lines 17-20, "The computation unit ... type or defuzzified"; column 6, lines 51-56, "the processing block ... the calculator block 4")
- inferring a fuzzy inference by determining a conjunction of said plurality of rule outputs (column 4, lines 54-62, "Another aspect of...logic inference rule"; column 6, lines 57-67, "The union block 19 ... the present invention"; column 7, lines 1-7, "can still be ... and one output 26")

However, *Giacalone et al* doesn't explicitly teach producing a tactical picture while *Singh et al* teaches,

- producing a tactical picture that incorporates said output from said fuzzy inference system (page 752, Abstract, "A consistent tactical...fuzzy logic techniques")

Motivation – The portions of the claimed method would have been a highly desirable feature in this art for

- Providing approximate solutions to complex engineering problems (*Singh et al*, page 752, section I, paragraph 3, "Fuzzy logic provides...complex engineering problems")

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify *Giacalone et al* as taught by *Singh et al* for the purpose of providing approximate solutions to complex engineering problems.

Art Unit: 2121

Regarding claim 14:

Giacalone et al's teaches:

- producing a plurality of one dimensional solutions in response to said uncertain input data (Fig. 3, items 44, 58; column 5, lines 16-21, "With reference to ... same reference system")
- inferring a fuzzy inference output by determining a conjunction of said one--dimensional solutions (column 4, lines 54-62, "Another aspect of ... logic inference rule"; column 6, lines 17-20, "The computation unit ... type or defuzzified"; column 6, lines 51-56, "the processing block ... the calculator block 4")

However, *Giacalone et al* doesn't explicitly teach a tactical picture display while *Singh et al* teaches,

- the step of generating from said fuzzy inference output a tactical picture display which represents uncertainty (page 752, Abstract, "A consistent tactical...fuzzy logic techniques") associated with the physical phenomena (page 761, left column, first paragraph, "The true target...in Table II")

Motivation – The portions of the claimed method would have been a highly desirable feature in this art for

- Providing approximate solutions to complex engineering problems (*Singh et al*, page 752, section I, paragraph 3, "Fuzzy logic provides...complex engineering problems")

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify *Giacalone et al* as taught by *Singh et al* for the purpose of providing approximate solutions to complex engineering problems.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Giacalone et al* in view of *Singh et al* and in further view of *Hicks et al* "Intelligent Agent-Based Software Architecture for Combat Performance under Overwhelming Information Inflow and Uncertainty" (11-13 June 2001).

Regarding claim 17:

Giacalone et al's teaches:

- producing a plurality of one dimensional solutions in response to said uncertain input data (Fig. 3, items 44, 58; column 5, lines 16-21, "With reference to ... same reference system")
- inferring a fuzzy inference output by determining a conjunction of said one--dimensional solutions (column 4, lines 54-62, "Another aspect of ... logic inference rule"; column 6, lines 17-20, "The computation unit ... type or defuzzified"; column 6, lines 51-56, "the processing block ... the calculator block 4")

However, *Giacalone et al* doesn't explicitly teach a tactical picture display or the tactical picture display generated from said fuzzy inference output further depicting a range of possibilities for the military commander to choose among while *Singh et al* teaches,

- the step of generating from said fuzzy inference output a tactical picture display which represents uncertainty (page 752, Abstract, "A consistent tactical... fuzzy logic

Art Unit: 2121

techniques”) associated with the physical phenomena (page 761, left column, first paragraph, “The true target...in Table II”)

- the tactical picture display generated from said fuzzy inference output further depicting a range of possibilities (page 760, Table I; page 761, Table II; page 763, left column, paragraphs 2-3, “The corresponding binary...not be associated”; page 763, right column, paragraph 1, sentence 1 through paragraph 3, sentence 1, “Fig. 26 suggests...in Fig. 18”; page 765, Figs. 30-32; page 766, Figs. 33-36; page 767, Fig. 37) in a military simulation (page 765, left column, section B, paragraph 1, “The Mission Avionics ... sophisticated laboratory simulations”)

Hicks et al teaches,

- the tactical picture display further depicting a range of possibilities (page 200, section 1, “The task of ... be defined unambiguously”) for the military commander to choose among (Abstract, “In the highly ... avoiding counter detection”)

Motivation – The portions of the claimed method would have been a highly desirable feature in this art for

- Providing approximate solutions to complex engineering problems (*Singh et al*, page 752, section I, paragraph 3, “Fuzzy logic provides... complex engineering problems”)
- Delivering real time optimal strategies in a dynamic environment (*Hicks et al*, page 201, left column, section 2.2.1, paragraph 1, “Motivation. In the highly ... a dynamic environment”)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify *Giacalone et al* as taught by *Singh et al* and *Hicks et al* for the purpose of providing approximate solutions to complex engineering problems as well as delivering real time optimal strategies in a dynamic environment.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- *Ganesh*; USPN 6,282,526; Fuzzy logic based system and method for information processing with uncertain input data
- *Giacalone et al*; U.S. Patent Number 5,710,867; Method for parallel processing of fuzzy logic inference rules and corresponding circuit architecture with fuzzy inputs and outputs
- *Bessacini et al*; USPN 5,671,138; Fuzzy controller for acoustic vehicle target intercept guidance
- *Kunemund et al*; USPN 5,704,010; Arrangement for rule decoding and evaluation for a high-resolution fuzzy inference processor
- *Singh et al*; "Fuzzy Logic Applications to Multisensor-Multitarget Correlation"; IEEE Transactions on Aerospace and Electronic Systems; Vol. 33, Iss. 3; July 1997; pp 752-769
- *Hicks et al*; "Intelligent Agent-Based Software Architecture for Combat Performance under Overwhelming Information Inflow and Uncertainty"; Proceedings Seventh IEEE

International Conference on Engineering of Complex Computer Systems; 11-13 June 2001; pp 200-210

- *Hisano*; USPN 5,179,625; Fuzzy Inference System Having a Dominant Rule Detection Unit

- *Tsutsumi et al*; USPN 5,131,071; Fuzzy Inference Apparatus

- *Hisano*; EPN 0 361 401 A2; Fuzzy Inference System Having a Rule Processing Means

- *Fagarasan et al*; USPN 5,317,319; Automatic Global Radar/IR/ESM Track Association Based on Ranked Candidate Pairings and Measures of their Proximity

- *Komai et al*; USPN 5,218,555; Method for Judging a Color Difference Using Rules Fuzzy Inference and Apparatus Therefore

- *Tsuda et al*; USPN 5,175,795; Hybridized Frame Inference and Fuzzy Reasoning System and Method

- *Sekine*; USPN 5,186,150; Method and System for Measuring Fluid Flow Rate by Using Fuzzy Inference

- *Togai et al*; "Expert System on a Chip"; Proceedings of the ACM SIGART international symposium on Methodologies for intelligent systems; December 1986

- *Dougherty et al*; "An approximate Optimal Ballistic Intercept Guidance Law"; Proceedings of the 33rd IEEE Conference on Decision and Control; Vol. 4; 14-16 Dec. 1994; pp 3871-3876

Any inquiry concerning this communication or earlier communications from the Office should be directed to Meltin Bell whose telephone number is 571-272-3680.

This Examiner can normally be reached on Mon - Fri 7:30 am - 4:30 pm.

If attempts to reach this Examiner by telephone are unsuccessful, his supervisor, Anthony Knight, can be reached on 571-262-3687. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2100.

MB

7 M. U.



Anthony Knight
Supervisory Patent Examiner
Group 3600